ECE SEMINAR

Martin Schulz

Chair of Computer Architecture and Parallel Systems
Technical University of Munich

March 9th, 1:30 PM to 2:30 PM

Location: SEH B1270

Inevitability of Integrated HPC Systems and Their Impact on the Software Stack

ABSTRACT

High-Performance Computing (HPC) is at an inflection point in its evolution. General-purpose architectures approach limits in terms of speed and power/energy, requiring the development of specialized architectures to deliver accelerated performance. At the same time, data movement has been identified as a main culprit of energy waste, pushing hardware designers towards a tighter integration of the different technologies. The result is a trend to integrated systems, which offer great opportunities in terms of power/performance tradeoffs, but also lead to challenges on the software side. They require new concepts in malleability in operating systems and programming models, all the way to system-wide resource management. We are attacking these challenges in two EuroHPC projects: DEEP- SEA, covering a comprehensive software stack for the first European exascale system including new additions to MPI to support malleable applications, and REGALE, providing adaptive resource management across workflows, with a special focus on power and energy management. Combined, they will address these challenges with that introduce a novel way to design, program, and operate HPC systems.

BIOGRAPHY

Martin Schulz is a Full Professor and Chair for Computer Architecture and Parallel Systems at the Technische Universität München (TUM), which he joined in 2017, as well as a member of the board of directors at the Leibniz SupercompuRng Centre. Prior to that he held posiRons at the Center for Applied ScienRfic CompuRng (CASC) at Lawrence Livermore NaRonal Laboratory (LLNL) and Cornell University. He earned his Doctorate in Computer Science in 2001 from TUM and a Master of Science in Computer Science from UIUC. MarRn's research interests include parallel and distributed architectures and applicaRons; performance monitoring, modeling and analysis; memory system opRmizaRon; parallel programming paradigms; tool support for parallel programming; power-aware parallel compuRng; and fault tolerance at the applicaRon and system level, as well as quantum compuRng and quantum compuRng architectures and programming, with a special focus on HPC and QC integraRon. MarRn has published over 250 peer-reviewed papers and currently serves as the chair of the MPI Forum, the standardizaRon body for the Message Passing Interface, one of the dominaRng standard in High-Performance CompuRng. He was a recipient of the IEEE/ACM Gordon Bell Award in 2006 and an R&D 100 award in 2011. He served on many conference and workshop organizing and program commicees including as program chair for ISC 2021, PC area chair at IPDPS 2021 and general chair of EuroMPI 2021.

Hosted by Dr. El-Ghazawi